

It is claimed:

1. A process for recovering low sodium lithium salts from brine comprising:
 - preparing a brine containing about 6.0wt% lithium and magnesium;
 - adding mother liquor containing carbonate from a prior precipitation step to precipitate magnesium as magnesium carbonate;
 - adding a solution of CaO and sodium carbonate to remove calcium and magnesium;
 - adding further sodium carbonate solution to precipitate lithium carbonate and recovering the lithium carbonate;
 - preparing an aqueous slurry of the recovered lithium carbonate and adding carbon dioxide gas to the slurry at a temperature of from 10 to about 30° C;
 - increasing the temperature to from about 70 to about 95°C to precipitate low sodium lithium carbonate having a sodium content of less than 0.0002 wt%.
2. The method of claim 1, further comprising reacting the low sodium lithium carbonate with hydrochloric acid having a sodium content of less than 0.15 ppm to produce low sodium lithium chloride having a lithium content of less than about 0.001wt%.
3. A process for the direct recovery of lithium chloride from brine comprising:
 - preparing a brine containing about 6.0wt% lithium, magnesium, calcium and sulfate;
 - adding quick lime CaO or Ca(OH)₂ to the brine to coprecipitate magnesium and calcium;
 - adding oxalate to remove remaining calcium by precipitating calcium oxalate;
 - adding barium to remove sulfate by precipitating barium sulfate;
 - adjusting the final pH of the brine to about 7.0 to precipitate lithium chloride.

4. An apparatus for the continuous purification of lithium carbonate comprising:
 - a reactor for continuously dissolving lithium carbonate to form lithium bicarbonate, said reactor including a settler to separate solids from liquids;
 - an ion exchanger to further remove metal impurities;
 - a crystallizer to regenerate the purified lithium carbonate;
 - a means to recycle CO_2 and mother liquor from the crystallizer to said reactor.
5. The apparatus of claim 4, further comprising a heat exchanger to transfer heat from the mother liquid to the bicarbonate solution.

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